Halt Changes (BIG-STEP)

Add $halt : Int \rightarrow State$ and a predicate halt? true only for the halt states.

$$\frac{\langle a, \sigma\rangle \Downarrow \langle i\rangle}{\langle \texttt{halt } a, \sigma\rangle \Downarrow \langle halt(i)\rangle} \tag{1}$$

$$\frac{\langle s_1, \sigma\rangle \Downarrow \langle \sigma''\rangle,\ \langle s_2, \sigma''\rangle \Downarrow \langle \sigma'\rangle}{\langle s_1; s_2, \sigma\rangle \Downarrow \langle \sigma'\rangle}\text{if not halt?}(\sigma'') \tag{2}$$

$$\frac{\langle s_1, \sigma\rangle \Downarrow \langle halt(i)\rangle}{\langle s_1; s_2, \sigma\rangle \Downarrow \langle halt(i)\rangle} \tag{3}$$

$$\frac{\langle b, \sigma\rangle \Downarrow \langle true\rangle,\ \langle s, \sigma\rangle \Downarrow \langle \sigma''\rangle,\ \langle \texttt{while } b\ s, \sigma''\rangle \Downarrow \langle \sigma'\rangle}{\langle \texttt{while } b\ s, \sigma\rangle \Downarrow \langle \sigma'\rangle}\text{if not halt?}(\sigma'') \tag{4}$$

$$\frac{\langle b, \sigma\rangle \Downarrow \langle true\rangle,\ \langle s, \sigma\rangle \Downarrow \langle halt(i)\rangle}{\langle \texttt{while}\ \ b\ s, \sigma\rangle \Downarrow \langle halt(i)\rangle} \tag{5}$$

$$\frac{\langle s, \emptyset\rangle \Downarrow \langle \sigma\rangle,\ \langle a, \sigma\rangle \Downarrow \langle i\rangle}{\langle s; a\rangle \Downarrow \langle i\rangle} \text{if not halt?}(\sigma) \tag{6}$$

$$\frac{\langle s, \emptyset\rangle \Downarrow \langle halt(i)\rangle}{\langle s; a\rangle \Downarrow \langle i\rangle} \tag{7}$$

Halt changes (SMALL-STEP)

All the existing rules, adding:

$$\frac{\langle a, \sigma\rangle \to \langle a', \sigma\rangle}{\langle \texttt{halt}\ \ a, \sigma\rangle \to \langle \texttt{halt}\ \ a', \sigma\rangle} \tag{8}$$

$$\frac{\cdot}{\langle \texttt{halt}\ \ i; s, \sigma\rangle \to \langle \texttt{halt}\ \ i, \sigma\rangle} \tag{9}$$

$$\frac{\cdot}{\langle \{\texttt{halt}\ \ i\}, \sigma\rangle \to \langle \texttt{halt}\ \ i, \sigma\rangle} \tag{10}$$

$$\frac{\cdot}{\langle \texttt{halt}\ \ i; a, \sigma\rangle \to \langle i, \sigma\rangle} \tag{11}$$